Nymphæa from a paper now in press. The embryo in its development and mature form is typically dicotyledonous in *Nymphæa*, though it lacks a suspensor in *Nuphar*. The primary root quickly perishes, and the stem becomes tuberous immediately above the epicotyl. The root tip of *Nuphar* resembles that of *Zea mais*, but in *Nymphæa* it is like that of Papilionaceæ and Cucurbitaceæ. The vascular bundle of the root of *Nymphæa* is radial and polyarch. The scattered bundles of the stem of *Nuphar* and some *Nymphæas* give place to a distinct vascular cylinder with leaf-gaps in the primitive *Nym. mexicana*. In no case are the bundles oriented as in monocotyls. From each leaf three traces come into the stem, one central and two lateral; they differ from many dicotyls only in possessing a transverse commissure connecting the three traces. No secondary growth of the bundles takes place in any part of the plant. In this and in the polyarch roots and in the short life of the primary root are the only similarities between *Nymphæa* and the monocotyls. These are best explained as adaptations to a long established aquatic habit.

An Exploration of a Peat-forming Lake (illustrated): Dr. G. P. BURNS, University of Michigan.

Perhaps no line of ecological research shows the deficiency of present methods better than the work on peat bogs. These are cited as examples of 'xerophytic' habitats and there are many theories offered explaining the presence of plants growing in them.

These theories differ widely. Nor can we expect them to do otherwise under present methods.

The first problem of the ecologist must be to gather and record facts, but these must be submitted, as far as possible, to experiment before attempting to determine their final value. As in all other lines of botanical research, experimental work is indispensable.

A study of the plants in peat-forming lakes near Ann Arbor, Mich., shows that they are by no means all xerophytes. With xerophytes are found many plants whose structure is either mesophytic or hydrophytic.

In fact, within a circle whose diameter is only a few feet may be found plants belonging to all three of these groups of plants.

Peat bogs then, as such, can not be called 'xerophytic' habitats.

W. F. GANONG,
Secretary.

SCIENTIFIC BOOKS.

Die Gletscher. By Dr. HANS HESS. Braunschweig, Friedrich Vieweg und Sohn. 1904. Large 8°, pp. xi + 426.

This is the only important work on glaciers that has appeared since the well-known book of Professor Heim was published in 1885, and it is of the same general excellent character. Dr. Hess has had a good preparation for writing the book by his training as a physicist, which is of much importance in the actual study of glaciers, and by many years of careful observations and measurements of the glaciers of the Oetzthal in conjunction with Professor Finsterwalder and Dr. Blümcke; and he makes many references to the very important observations which they have made, especially on the Vernagt and Hintereis glaciers, which have thrown so much light on the theory of glacier motion.

The plan of the book does not differ essentially from that of Professor Heim. The matter is presented inductively; first assembling the observations and facts and then giving the theories to account for them. The large amount of work which has been done in the last twenty years makes such a work very desirable and Dr. Hess has collected all the material and has presented it in a most attractive and interesting form.

He begins by giving the physical properties of ice with accounts of the experiments for determining the plasticity and other constants. The climate of glacial regions is considered, and then the forms of glaciers, which leads to a study of the position of the névé line; he gives the different methods for determining the height of this line, one of which, due to Dr. Hess, depends upon the forms of the contour lines above and below the névé line and can be used when one has a good contour map. Dr. Hess divides glaciers into two general classes; the Alpine type or the valley glaciers and the inland ice type, and says that these two are not separated by any definite line but that they gradually grade into each other through glaciers of intermediate type. A description of the general distribution of glaciers over the world completes the first part of the work.

The movement of glaciers is then discussed and many determinations of velocity are given. The very incomplete observations which we have bearing on the changes of velocity in passing from the surface to the bed, is supplemented by the observations of Dr. Hess, in which he shows by means of the theory given further on, that the average velocity through a particular section of the Hintereis glacier is less than the average velocity of the surface. The thickness of the ice was determined by borings which completely pierced the glacier, one of which was 153 meters deep. Dr. Hess was convinced, as a result of his general observations, that the blue bands of glaciers were merely modified strata, and by means of an artificial glacier, made up of layers of different colored wax, succeeded in making the original layers take the forms which the bands assume. In the chapter on 'Ice and Rock,' the phenomena of moraines, superficial and internal, are described, following the classification adopted at the Rhone conference in 1899. He considers that glaciers are strong erosive agents and fortifies this view by a measurement of the quantity of material being brought to the surface by one of the internal moraines. The origin of this moraine he follows to a snow-covered peak in the region of the reservoir, whose character is such that he thinks the material could not have fallen from its surface and must therefore have been derived from the glacier's bed. In the chapter on 'The Ice Age' he also shows how the valleys have changed their shapes into the well-known glacial troughs.

A very interesting account is given of the variations of glaciers. Beginning with the seasonal changes, he goes on to describe the larger variations which follow Bruckner's period and he collects together the observations that have been made on this subject. He considers that the main cause of the glacial variations are variations of climate but that this is greatly modified by topographic conditions. Glaciers like the Vernagt, which have a large basin-like reservoir and a narrow tongue, do not begin to advance until there has been a large collection of snow in the reservoir and then the advance takes place very rapidly; whereas another glacier, whose outlet from the reservoir is broad and open, will probably respond quickly to climatic changes. He describes very interesting changes that have taken place in the Vernagt glacier since 1895, when the accumulation in the reservoir began to show itself; the end continued to retreat until 1897, after which came an advance. This advance seems to have run its course as the glacier is now about stationary. The observations showed that the ice grew thicker in the reservoir and that what might be called a wave advanced along the glacier to its end, very greatly increasing the velocity of the ice and itself moving still more rapidly. The historical theories of the cause of glacial motion are described; Dr. Hess looks upon the plasticity of ice as the property which allows it to flow. It is only at this point that he takes up the geometrical theory of glacial motion, given simultaneously by Finsterwalder and by Reid, and describes the lines of flow and the relations existing between accumulation, flow and melting. This theory is so fundamental in its bearings on all glacial phenomena that it might have been given with advantage in an earlier part of the book. This is followed by an account of Professor Finsterwalder's mathematical theory of glacier variations. In this theory, Professor Finsterwalder

expresses the fact that the increase in any section is equal to the difference between the ice which enters and leaves it, less the amount melted. Assuming that the velocity is in proportion to the square root of the thickness, that the melting is proportional to the horizontal projection of the surface and that there are certain fundamental variations of thickness at the névé line, which may be considered as due to climatic changes, Professor Finsterwalder finds that a glacier will go through variations which correspond very well with those observed. This is a most excellent beginning of a more exact understanding of glacial variations, though the assumptions are by no means accurate. The last chapter contains an account of the 'Ice Age' with special descriptions of the Alps in that period and describes the changes which have taken place in the topography as a result of the occupation of the valleys by the glaciers. The Ice Age, of course, can not be treated fully except in one or more volumes by itself.

In conclusion, we may say that the book is well and clearly written and is thoroughly reliable in its facts; it will be of the greatest value to all students of glaciers.

HARRY FIELDING REID.
JOHNS HOPKINS UNIVERSITY,
March 11, 1905.

The Varnishes of the Italian Violin Makers of the Sixteenth, Seventeenth and Eighteenth Centuries and their Influence on Tone. By GEORGE FRY, F.L.S., F.C.S. London, Stevens and Sons, Ltd. 1904.

About a fifth of the book deals with the minute description of the old violin varnishes as used by the best Italian makers. This is important as it is the only means of determining the composition of them, for it is clearly out of the question to remove the varnish from Straduarius violins and analyze it.

Following this is a chapter upon the influence of varnish upon the tone of violins, in which is shown that it has a decided influence and that oil rather than spirit varnishes are to be preferred. Two chapters are devoted to the manufacture of oil varnishes and those from turpentine derivatives.

The most important part of the book is contained in the last two chapters, in which the author thinks it more reasonable that the varnishes used in Italy were made from the materials close at hand—turpentine, linseed oil and rosin, the latter oxidized by treatment with nitric acid—than from some remarkable mystical gum. He substantiates his theory by describing a series of sixteen experiments in the manufacture of varnishes, using a nitrated mixture of rosin and linseed oil. A number of interesting problems are discussed, as, for example, the production of dichroism in varnishes, and studies in the drying of varnishes, the fact that age in violins is a detriment rather than an advantage, as usually supposed. Incidentally it should be remarked that the processes of manufacturing the nitrated varnishes have been patented in this country and abroad. The work is a valuable one to both the violin and the varnish maker, particularly to the latter on account of the material relating to the nitro-oleo varnishes which, so far as the reviewer is informed, is new.

A. H. GILL.

SCIENTIFIC JOURNALS AND ARTICLES.

THE opening article in the *Journal of Nervous and Mental Diseases* for March is by Dr. H. A. Hoppe, who discusses under the title of 'Soul Paralysis' some very interesting problems of the higher reflex acts, dealing with the relation between sensory stimuli and motor activity. This article is followed by a careful report by Dr. F. Robertson Sims of the 'Anatomical Findings in two Cases of Korsakoff's Symptom-complex.' Dr. Charles W. Burr reports a case of myasthenia gravis with autopsy, adding one more to the list of cases in which the thymus gland was persistent or persistent and diseased in the adult and associated with lymphoid infiltration of the muscles. The case is particularly interesting clinically because of the presence of visual symptoms, most frequently met with in and formerly regarded as pathognomonic of hysteria. Dr. S. G. Webber adds two more cases to the literature of multiple sclerosis, and suggests that the apparent rarity of the disease may be partially due to failure to get correctly diag-